Circular No. 4, August 30, 1917.

DEPARTMENT OF THE INTERIOR,

BUREAU OF EDUCATION.

THE WORK OF AMERICAN COLLEGES AND UNIVERSITIES DURING THE WAR.

CONTRIBUTION OF HIGHER INSTITUTIONS TO THE WAR AND TO RECONSTRUCTION.

This is a war of engineers, of chemists, of physicists, of agriculturists, of doctors, quite as much as of soldiers. The services of men of scientific training are indispensable. Engineers are needed in every important military operation, in transportation, in communication, in most of the supporting industries. The chemist and the physicist are in greater demand than ever before, both at the front and behind it. The fate of the Nation depends in large measure on the amount of agricultural product and its economic use and distribution. The task of saving the lives and restoring the health of hundreds of thousands of wounded calls for the services of regiments of doctors.

For three years the allied countries have been learning these facts. In the beginning of the war Great Britain and Canada allowed hundreds of scientific experts to go to the trenches as privates or officers of the line. Their higher institutions were decimated. When the demand for the peculiar services of these technically trained men became imperative the men were no longer available. The supply ordinarily furnished by the higher institutions had also been temporarily cut off. Both Great Britain and Canada have realized that their failure to use technical men in technical service and to keep a constant flow of scientifically trained students issuing from their institutions was a mistake. Measures are now in progress in both countries to restore the depleted supply of men of general and specialized higher education.

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When the United States entered the war the leaders of public thought saw that in spite of the warning example furnished by the allied countries this Nation was likely to overlook the essential contribution which the American higher institutions would be called upon to make. Not only must these institutions be kept in full operation in order to insure the success of the country's military enterprise, but their function in furnishing the instruments of reconstruction has become more important than before. The large diminution in the number of highly trained men throughout the world throws on America the burden of contributing a disproportionate share of the leaders for the material upbuilding which must everywhere be undertaken after the war.

Ordinarily, demand and supply in the case of professionally trained men, as in the case of commodities, tend to strike a fairly even balance. This balance will be rudely disturbed, and already is disturbed, by the imperative exigencies of the war. Technical experts are now needed in large numbers for purely military service. Meanwhile, it is safe to assume that the conditions of civilian life have not been altered to such an extent that all of these men can be comfortably spared. Already the possibility of a shortage may be foreseen, and the remoter demands due to casualties and to the activities of reconstruction can not yet be estimated.

Some indication of the possible discrepancies between the demand and the supply of technical men may be derived from the following statements:

The Engineer Corps estimates that it will have from five to six thousand engineer officers in service by early spring. Approximately 6 per cent of the total force of a modern army is made up of engineer regiments. The privates in these regiments need not be men with higher technical training, however. The industries which furnish war supplies are to be immensely stimulated, and these are the industries which chiefly demand the services of engineers. Below is a tabular presentation of the output of all engineering schools of the United States since 1895:

Graduates in engineering, 1895 to 1916, inclusive.

Chemical engineering	1,172
Civil engineering	11,621
Electrical engineering	6,357
Mechanical engineering	11,291
Mining engineering	3,195
Metallurgical engineering	150
Engineering (general)	1,897
Marine engineering	15
Textile engineering	48
Agricultural engineering	31
Total	35,777

Except for the years 1915 and 1916 those numbers include both bachelor and graduate degrees.

Total number of graduates in engineering in 1895 was 752.

Graduates in engineering in 1916.

Chemical engineering	340
Civil engineering	1,236
Electrical engineering	1,098
Mechanical engineering	1,164
Mining engineering	267
Metallurgical engineering	12
Engineering not specified	163
Marine engineering	9
Textile engineering	12
Agricultural engineering	5
Total	4,306

Students in engineering in 1916.

General engineering	5,485
Chemical engineering	2,774
Civil engineering	7,251
Electrical engineering	7,098
Mechanical engineering	7,707
Mining engineering	1,790
Other types of engineering	1,001
Total	33,106

The situation with reference to engineering is nearly paralleled in several other technical callings. It is this fact which has induced statesmen, educators, scientific associations, and industrial leaders to urge repeatedly and emphatically that the higher institutions of the country, and particularly those which give technical or scientific training be kept in full operation, and that young men everywhere be encouraged to attend them. Such attendance is represented as a high patriotic service. Below are some of the most striking of these statements:

LETTER OF SECRETARY LANE TO PRESIDENT WILSON.

DEPARTMENT OF THE INTERIOR,
Washington, July 19, 1917.

DEAR MR. PRESIDENT: My attention has been called to the fact that the colleges and universities of the country anticipate a considerable falling off in the number of students who will enter their freshman classes in the coming autumn. A large diminution of the upper classes is of course inevitable. The experience of the allied countries has abundantly proved that the services of highly trained men are needed to a greater degree in this war than in any preceding conflict, and that large numbers of scientists and engineers especially are essential to success.

It is therefore of the utmost importance that a continuous, and if possible a constantly increasing, supply of trained men should be sent out by our higher

institutions. After pursuing a contrary policy for several years the Canadian universities have come to recognize this and are now urging all high-school students who can do so to continue their studies in order to make their services more valuable to the nation. I believe that a word from you coming at this time will put this matter in its proper light before the youth of the country and will reassure many parents who have been uncertain as to what their children should be encouraged to do.

FRANKLIN K. LANE.

The PRESIDENT,
The White House.

REPLY OF PRESIDENT WILSON TO SECRETARY LANE.

THE WHITE HOUSE,
Washington, 20 July, 1917.

MY DEAR MR. SECRETARY: The question which you have brought to my attention is of the very greatest moment. It would, as you suggest, seriously impair America's prospects of success in this war if the supply of highly trained men were unnecessarily diminished. There will be need for a larger number of persons expert in the various fields of applied science than ever before. Such persons will be needed both during the war and after its close. I therefore have no hesitation in urging colleges and technical schools to endeavor to maintain their courses as far as possible on the usual basis. There will be many young men from these institutions who will serve in the armed forces of the country. Those who fall below the age of selective conscription and who do not enlist may feel that by pursuing their courses with earnestness and diligence they also are preparing themselves for valuable service to the Nation. I would particularly urge upon the young people who are leaving our high schools that as many of them as can do so avail themselves this year of the opportunities offered by the colleges and technical schools, to the end that the country may not lack an adequate supply of trained men and women.

Cordially and sincerely, yours,

WOODROW WILSON.

Hon. FRANKLIN K. LANE,
Secretary of the Interior.

STATEMENT OF SECRETARY OF WAR BAKER.

[The Evening Sun (New York), Aug. 24, 1917.]

The most useful thing a high school boy can do is to finish his course, because the Nation in the next years will need all the trained men it can get.

It follows that a boy should be training himself for a productive career, at the same time keeping his body especially fit for military service, which he may be called upon to perform when he is old enough.

He should certainly be preparing himself to understand the meaning of this great war, and the reasons why America is fighting and the kind of peace we and our allies mean to establish.

STATEMENT OF THE COMMISSIONER OF EDUCATION, MAY 22, 1917.

It is to be expected that many of the older and upper class men in colleges, universities, and technical schools will volunteer for some branch of the military service, but all young men below the age of liability to selective draft and those

not recommended for special service should be urged to remain and take full advantage of the opportunities offered by the colleges, universities, and technical schools, to the end that they may be able to render the most effective service in the later years of the war and the times of need that will follow. Practically all women students should remain, and all boys and girls graduating from high schools should be urged to enter college, technical school, or normal school. The total number of students in these schools should be increased rather than diminished. All students should be made to understand that it is their duty to give to their country and to the world the best and fullest possible measure of service, and that both will need more than they will get of that high type of service which only men and women of the best education and training can give. Patriotism and the desire to serve humanity may require of these young men and women the exercise of that very high type of self-restraint that will keep them to their tasks of preparation until the time comes when they can render service which can not be rendered by others.

RESOLUTIONS OF THE SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION.

[Washington, July 7, 1917.]

It is the opinion of the Society for the Promotion of Engineering Education in annual convention assembled that—

Whereas the conduct of the present great war involves not simply military operations at the front, but, of equal importance, the utilization of our resources and the maintenance of our industries in order that the production of food and raw materials, the manufacture of munitions of war, and the products needed for the support of our armies and those of our allies shall be most effective; and

Whereas to these ends it is absolutely essential that our armies, industries, mines, hospitals, and fields should be supplied continuously with scientifically trained men; and

Whereas the withdrawal of large numbers of undergraduates from our engineering and medical schools for enlistment in the Army and in various forms of Government service threatens to cut off the supply of such trained men to the armies and the industries which are so necessary to our military success;

Resolved, That for the most successful prosecution of the war it is essential that students of engineering as a rule complete their college courses, and that such engineering students as may necessarily be drafted for military service should be placed in positions in which they may render the best service of which they are capable.

Resolved, That a copy of these resolutions be transmitted to the President of the United States, the Secretaries of War and of Navy, the Chief of Engineers, and such other public officers as the president and secretary of the society may designate.

RESOLUTIONS OF THE COMMITTEE ON TECHNICAL PHYSICS OF THE AMERICAN PHYSICAL SOCIETY.

[Ithaca, N. Y., June 27, 1917.]

I. We believe that America should profit by the experience of England in conserving our scientific men, and that in order to meet the urgent scientific needs of the country, whether for war or for industry, provision should be made

for an increased output of graduates from our scientific and technical colleges by—

(*a*) Requiring promising students of military age who are well along in approved courses of study, even if drafted, to complete such courses (on Government expense if necessary,), preparatory to service where needed, either in military or in civil life; and

(*b*) Urging a sufficient number of young men of promise to continue in or to enter the regular four-year technical and scientific courses, or such other special shorter courses as it may be deemed necessary to offer.

II. We believe that the scientific and technical resources of the country should be conserved in every possible way, and that provision should be made for a continuous output of scientific work.

(*a*) Scientists already trained, except such as may already be engaged directly or indirectly in Government work, should be encouraged to continue their investigations, whether in university or industrial centers.

(*b*) It is an economic and scientific waste, unpardonable in war time, for the equipment of our universities to lie partially idle as concerns instruction or research. But even if there be a decrease in the number of students, universities should be encouraged to maintain their instructing staffs at least at normal size. Research should be regarded as a duty during time not occupied in teaching, and funds should be provided for carrying on such research. To make it possible for universities to carry out this program, names should be provided to assist them to meet any prospective deficit. A comparatively small sum spent in this way may pave the way for discoveries of the greatest value even from a military standpoint.

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